

M/035/002

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**Frederick D. Fox**  
Director, Environmental Affairs

**Kennecott**

September 27, 1994

Mr. Lynn Kunzler  
State of Utah Department of Natural Resources  
Division of Oil, Gas and Mining  
355 West North Temple  
Salt Lake City, UT 84180-1203

SEP 29 1994

Dear Mr. Kunzler:

The following information is provided in response to your letter dated 8/31/94 regarding the application of municipal sewage biosolids at the Bingham Canyon Mine. These items were discussed with Len Marrs and Jon Cherry during your site visit on 9/23/94.

1. One test site will initially be used. This site will contain 15 test plots each 16' wide by 50' long. Each plot will be amended with an application of sludge and soil. The composition, test plot layout, and treatment of each plot is attached. Sludge will be applied in varying amounts (maximum rate of 35 tons/acre) and disced 12"-15" deep into the plots.
2. Prior to the application of the sludge, one composite sample 0"-15" (one grab sample from each plot) will be collected from the waste rock and tested for the following:
  - a. Agricultural Tests - pH, SAR, EC, nitrogen as nitrate and nitrite, water holding capacity, CEC, acid-base potential, total organic matter content, soil texture, phosphorus, and carbon to nitrogen ratio (C:N).
  - b. Metals Tests - DTPA extractable metals (Fe, Zn, Cu, Mn, Cd, Pb, Ni, Cr), saturation extractable metals (Ca, Na, Mg) and total metals for As, Hg, Mo, and Se.

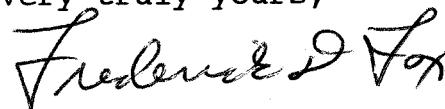
Prior to application of the sludge, samples will be collected from three downslope locations within the 65' x 330' test plot at depths of 0'-1', 1'-2', and 2'-3'. These samples will be tested for the items listed in 2a.

Mr. Lynn Kunzler  
September 27, 1994  
Page 2

From the same 3 sample locations, a sample from 0'-2' at each location will be collected prior to sludge application and tested for the items listed in 2b .

3. With the exception of the composite waste rock sample, the items listed in #2 will be repeated at a downslope location on an annual basis. Pending initial analysis, some parameters may be dropped from future testing.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Frederick D. Fox".

Frederick D. Fox

Attachment

FDF/JCC/jcc

cc: Lisa Roger, DWQ

KENNECOTT UTAH COPPER CORPORATION  
APPLICATION OF MUNICIPAL SEWAGE BIOSOLIDS  
BINGHAM CANYON MINE WASTE ROCK DUMPS  
5816 WASTE ROCK DUMP SLOPE TEST PLOTS

Initially municipal sewage biosolids will be applied to fifteen test plots, each 16 feet wide by 50 feet long. These will be constructed near the toe of the north end of the 5816 Eastside Waste Rock Mine Dump. These test plots replace the 31 test plots, 10 feet wide by 21 feet long, described in the application and shown on Dwg. No. 451-T-1218.

The test plots will be prepared in the waste rock and will be located within the Eastside Collection System which intercepts all water coming from the dumps. The overall dimensions of the test plot area are 65 feet wide by 330 feet long, approximately 0.5 acre.

The construction of the test plots and the application of municipal sewage biosolids is planned for late September and October, 1994.

The composition of and treatment of each of the test plots is described below.

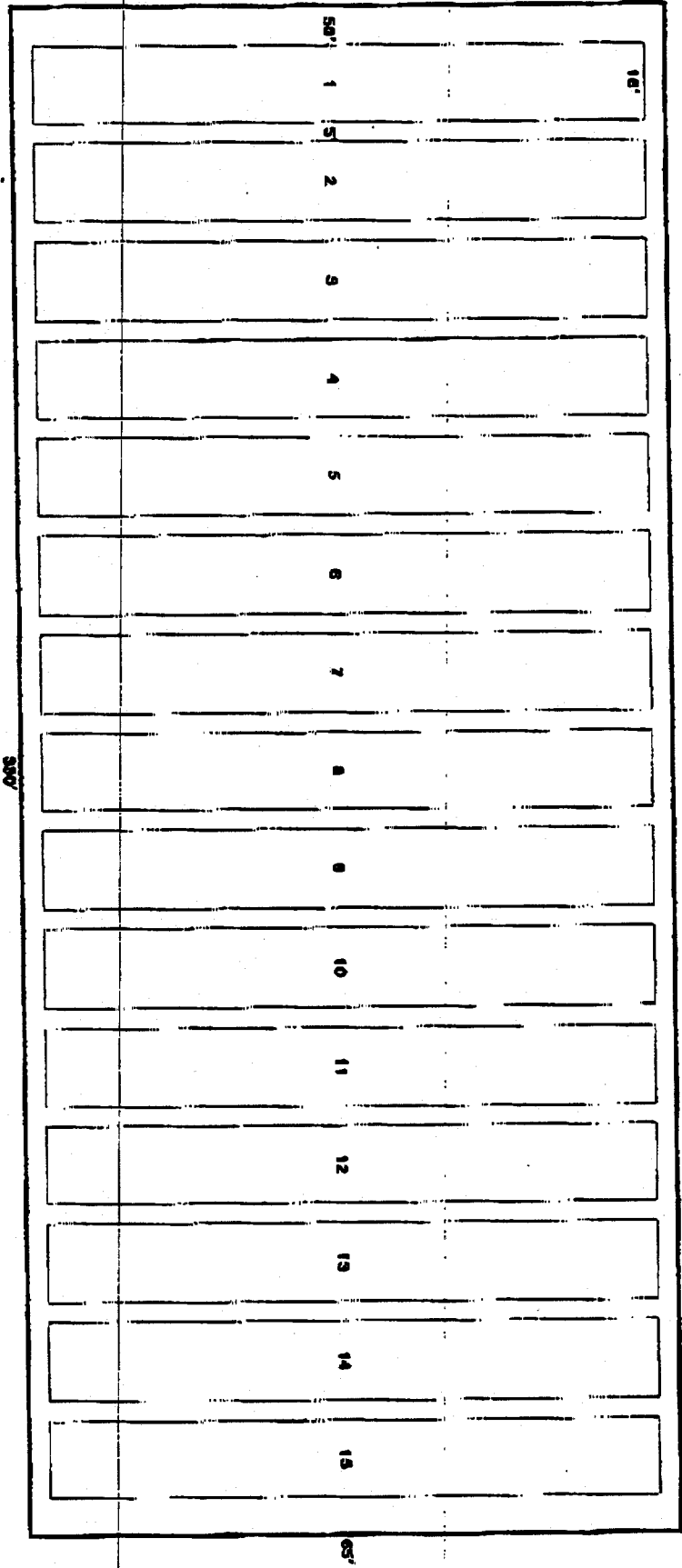
<u>TEST PLOT</u>	<u>COMPOSITION/TREATMENT</u>
No. 1	Control. Waste rock, ripped 12-15" deep, disced.
No. 2	Waste rock, 1" municipal sewage sludge, ripped 12-15" deep, disced.
No. 3	Waste rock, 2" sludge, ripped 12-15", disced.
No. 4	Control. Waste rock, 6" native soil, ripped 12-15", disced.
No. 5	Waste rock, 6" local soils(topsoil, clay, alluvium), 1' sludge, ripped 12-15", disced.
No. 6	Waste rock, 6" native soil, 2" sludge, ripped 12-15", disced.
No. 7	Control. Waste rock, 6" native soil, ripped 12-15", 6" soil, ripped 12-15", disced.
No. 8	Waste rock, 6" native soil, ripped 12-15", 6" soil, 1" sludge, ripped 12-15", disced.
No. 9	Waste rock, 6" native soil, ripped 12-15", 6" soil, 2" sludge, ripped 12-15", disced.

- No.10 Control. Waste rock, 6" sandy tailings, ripped 12-15", disced.
- No.11 Waste rock, 6" sandy tailings, 1" sludge, ripped 12-15", disced.
- No.12 Waste rock, 6" sandy tailings, 2" sludge, ripped 12-15", disced.
- No.13 Control. Waste rock, 6" sandy tailings, ripped 12-15", 6" sandy tailings, ripped 12-15", disced.
- No.14 Waste rock, 6" sandy tailings, ripped 12-15", 6" sandy tailings, 1" sludge, ripped 12-15", disced.
- No.15 Waste rock, 6" sandy tailings, ripped 12-15", 6" sandy tailings, 2" sludge, ripped 12-15", disced.

Local soils and sandy tailings will be used in various combinations within a plot or plots other than those listed above. The soil compositions given are generic examples. The amount of sewage biosolids applied will not exceed the 35 Tons/Acre approved by the EPA.

Additional test plots will be developed in the future in waste rock areas described in the application. Information will be submitted for any new test areas prior to construction.

KENECOTT UTAH COPPER CORPORATION  
APPLICATION OF MUNICIPAL SEWAGE BIOSOLIDS  
BINGHAM CANYON MINE WASTE ROCK DUMPS  
NORTH END 5816 EASTSIDE WASTE ROCK DUMP  
TEST PLOT LAYOUT



Total Area=0.5 Acre

Each plot is 16 x 50' = 800 s.f.

8/94

Not To Scale

All test plots are located on waste rock and are within the closed Eastside Collection System.